DAkkS
Deutsche
Akkreditierungsstelle

DAkkS | Deutsche Akkreditierungsstelle GmbH
Spittelmarkt 10 | 10117 Berlin | Germany

Empresa Nacional de Aeronáutica de Chile (ENAER)
Laboratorio Custodio de los Patrones Nacionales
Magnitud Presión y Humedad
Mr. Jorge Chavez Teuber
Gran Av. Jose Miguel Carrera 11087, El Bosque
8010744 Santiago de Chile
CHILE

Deutsche
Akkreditierungsstelle GmbH
(German Accreditation Body)
Office Berlin

Contact:
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04.04.2023

Your reaccreditation on 14.09.2022 – 27.10.2022

File number:
K-15211-01 2022 R1

Dear Mr. Chavez Teuber,

We are pleased to inform you that, based on the positive findings of the assessments taken place on 14.09.2022 – 27.10.2022, we have come to the conclusion, that the continuation of your accreditation is confirmed. Please find attached the accreditation certificate D-K-15211-01-00 with the corresponding annex.

The new accreditation cycle began with the decision on reaccreditation (04.04.2023) and ends no later than 03.04.2028.
The next reaccreditation is therefore planned for March 2027 in order to guarantee a timely accreditation decision and thus the validity of the accreditation. DAkkS will give notice of expiry of the accreditation in good time by asking you to apply for reaccreditation.

According to the current planning, the next surveillance assessment will take place in March 2024. This information is not yet binding.

Kindly be informed that you are requested to update us on any changes relevant to the accreditation in your case.

We look forward to continuing our cooperation and will be glad to answer any further questions you may have.

Yours sincerely,

Dipl.-Wirtsch.-Ing. (BA) Tim Harnisch
Head of Technical Unit 1.2
Mechanical, Thermodynamic, Chemical and Medical Quantities | Measuring Instruments
Department 1

DAkkS
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Accreditation

The Deutsche Akkreditierungsstelle attests with this **Accreditation Certificate** that

Empresa Nacional de Aeronáutica de Chile (ENAER)

with its calibration laboratory

Laboratorio Custodio de los Patrones Nacionales Magnitud Presión y Humedad
Gran Av. Jose Miguel Carrera 11087, El Bosque, 8010744 Santiago de Chile

meets the requirements according to ISO/IEC 17025:2017 for the conformity assessment activities listed in the annex to this certificate. This includes additional existing legal and normative requirements, including those in relevant sectoral schemes, provided they are explicitly confirmed in the annex to this certificate.

The management system requirements of ISO/IEC 17025 are written in the language relevant to the operations of calibration laboratories and confirm generally with the principles of ISO 9001.

This accreditation was issued after an accreditation procedure was carried out in compliance with the minimum requirements of DIN EN ISO/IEC 17011 and on the basis of a review and decision of the appointed accreditation committees.

This accreditation certificate is valid to 03.04.2028.

It consists of this cover sheet, the reverse side of the cover sheet and the following annex with a total of 3 pages.

Registration number of the accreditation certificate: **D-K-15211-01-00**

Berlin, 04.04.2023

Dipl.-Wirtsch.-Ing. (BA) Tim Harnisch
Head of Technical Unit

The certificate together with the annex reflects the status as indicated by the date of issue. The current status of any given scope of accreditation can be found in the directory of accredited bodies maintained by Deutsche Akkreditierungsstelle GmbH (www.dakks.de).

See notes overleaf

Deutsche Akkreditierungsstelle GmbH

Office Berlin
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10117 Berlin

Office Frankfurt am Main
Europa-Allee 52
60327 Frankfurt am Main

Office Braunschweig
Bundesallee 100
38116 Braunschweig

The Deutsche Akkreditierungsstelle GmbH (DAkkS) is the entrusted national accreditation body of the Federal Republic of Germany according to § 8 section 1 AkkStelleG in conjunction with § 1 section 1 AkkStelleGBV. DAkkS is designated as the national accreditation authority by Germany according to Art. 4 Para. 4 of Regulation (EC) 765/2008 and clause 4.7 of DIN EN ISO/IEC 17000.

The accreditation certificate shall be recognised as equivalent by the WTO member states that have committed themselves in bilateral or multilateral mutual agreements to recognise the certificates of accreditation bodies that are members of ILAC or IAF as equivalent.

DAkkS is a signatory to the multilateral agreements for mutual recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Co-operation (ILAC).

The up-to-date state of membership can be retrieved from the following websites:
EA: www.european-accreditation.org
ILAC: www.ilac.org
IAF: www.iaf.nu

Deutsche Akkreditierungsstelle

Annex to the Accreditation Certificate D-K-15211-01-00 according to ISO/IEC 17025:2017

Valid from:	**04.04.2023**	**Valid to:**	**03.04.2028**
Date of issue:	04.04.2023		

Holder of accreditation certificate:

Empresa Nacional de Aeronáutica de Chile (ENAER)

with its calibration laboratory

Laboratorio Custodio de los Patrones Nacionales Magnitud Presión y Humedad
Gran Av. Jose Miguel Carrera 11087, El Bosque, 8010744 Santiago de Chile

The calibration laboratory meets the requirements of ISO/IEC 17025:2017 to carry out the conformity assessment activities listed in this annex. The calibration laboratory meets additional legal and normative requirements, if applicable, including those in relevant sectoral schemes, provided that these are explicitly confirmed below.

The management system requirements of ISO/IEC 17025 are written in the language relevant to the operations of calibration laboratories and confirm generally with the principles of ISO 9001.

Calibrations in the fields:

Mechanical quantities

- **Pressure**

Thermodynamic quantities

Humidity quantities

- **Devices for relative humidity**

Within the measurands/calibration items marked with *, the calibration laboratory is permitted, without being required to inform and obtain prior approval from DAkkS, to use calibration standards or equivalent calibration procedures listed here with different issue dates.

The calibration laboratory maintains a current list of all calibration standards/equivalent calibration procedures within the flexible scope of accreditation.

This certificate annex is only valid together with the written accreditation certificate and reflects the status as indicated by the date of issue. The current status of any given scope of accreditation can be found in the directory of accredited bodies maintained by Deutsche Akkreditierungsstelle GmbH at https://www.dakks.de.

Annex to the Accreditation Certificate D-K-15211-01-00

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement [1]	Remarks
Pressure				
Absolute pressure p_{abs}*	0.015 bar to 0.08 bar	DKD-R 6-1:2014 EURAMET Calibration Guide No. 17 Version 4.0	$2.5 \cdot 10^{-5} \cdot p_{abs} + 3.5$ µbar	Pressure medium: gas p_{abs} = measured absolute pressure in bar The uncertainty of the measured residual pressure has to be added.
	> 0.08 bar to 7.0 bar		$2.0 \cdot 10^{-5} \cdot p_{abs} + 4.0$ µbar	
	> 7.0 bar to 35 bar		$2.5 \cdot 10^{-5} \cdot p_{abs} + 12$ µbar	
	> 35 bar to 70 bar		$2.5 \cdot 10^{-5} \cdot p_{abs} + 25$ µbar	
	> 70 bar to 251 bar	DKD-R 6-1:2014 EURAMET Calibration Guide No. 17 Version 4.0 Principle of measurement: $p_{abs} = p_e + p_{amb}$ with gas/oil-volume	$3.0 \cdot 10^{-5} \cdot p_{abs} + 0.25$ mbar	Pressure medium: gas p_{abs} = measured absolute pressure in bar The uncertainty of the measured atmospheric pressure has to be added.
Absolute pressure p_{abs}*	1.5 bar to 51 bar	DKD-R 6-1:2014 EURAMET Calibration Guide No. 17 Version 4.0 Principle of measurement: $p_{abs} = p_e + p_{amb}$	$3.0 \cdot 10^{-5} \cdot p_{abs} + 500$ µbar	Pressure medium: oil p_{abs} = measured absolute pressure in bar The uncertainty of the measured atmospheric pressure has to be added.
	> 51 bar to 501 bar		$3.0 \cdot 10^{-5} \cdot p_{abs} + 0.23$ mbar	
	> 501 bar to 1001 bar		$4.5 \cdot 10^{-5} \cdot p_{abs} + 0.47$ mbar	
	> 1001 bar to 1401 bar		$5.0 \cdot 10^{-5} \cdot p_{abs} + 0.33$ mbar	
	> 1401 bar to 2501 bar		$2.0 \cdot 10^{-4} \cdot p_{abs} + 10$ mbar	
Gauge pressure p_e*	–1.0 bar to –0.03 bar	DKD-R 6-1:2014 EURAMET cg-3 Version 1.0 EURAMET Calibration Guide No. 17 Version 4.0	$6.0 \cdot 10^{-5} \cdot \lvert p_e \rvert + 17$ µbar	Pressure medium: gas p_e = measured gauge pressure in bar
	–0.01 bar to 0.030 bar		$2.5 \cdot 10^{-4} \cdot \lvert p_e \rvert + 3.5$ µbar	
	> 0.030 bar to 0.08 bar		$2.0 \cdot 10^{-5} \cdot p_e + 3.5$ µbar	
	> 0.08 bar to 7.0 bar		$1.5 \cdot 10^{-5} \cdot p_e + 4.0$ µbar	
	> 7.0 bar to 35 bar		$2.2 \cdot 10^{-5} \cdot p_e + 12$ µbar	
	> 35 bar to 70 bar		$2.2 \cdot 10^{-5} \cdot p_e + 25$ µbar	
	> 70 bar to 250 bar	DKD-R 6-1:2014 EURAMET cg-3 Version 1.0 EURAMET Calibration Guide No. 17 Version 4.0 with gas/oil-volume	$3.0 \cdot 10^{-5} \cdot p_e + 0.25$ mbar	

[1] Unless otherwise specified, the unit of a variable corresponds to the unit of the measuring range

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement [1]	Remarks
Gauge pressure p_e*	0.5 bar to 50 bar	DKD-R 6-1:2014 EURAMET cg-3 Version 1.0 EURAMET Calibration Guide No. 17 Version 4.0	$3.0 \cdot 10^{-5} \cdot p_e$ + 500 µbar	Pressure medium: oil p_e = measured gauge pressure in bar
	> 50 bar to 500 bar		$3.0 \cdot 10^{-5} \cdot p_e$ + 0.23 mbar	
	> 500 bar to 1000 bar		$4.5 \cdot 10^{-5} \cdot p_e$ + 0.47 mbar	
	> 1000 bar to 1400 bar		$5.0 \cdot 10^{-5} \cdot p_e$ + 0.33 mbar	
	> 1400 bar to 2500 bar		$2.0 \cdot 10^{-4} \cdot p_e$ + 10 mbar	
Humidity Relative humidity	10 % to 85 %	LCPN-HR-101, Rev. C:2017 Climate cabinet Air temperature: 10 °C to 70 °C Dew point temperature: −5 °C to 60 °C	1.0 %	Uncertainty is an absolute value of relative humidity.
	> 85 % to 90 %		1.3 %	
	10 % to 40 %	LCPN-HR-201, Rev. C:2017 Humidity generator Air temperature: 5 °C to 70 °C	0.5 %	Uncertainty is an absolute value of relative humidity.
	> 40 % to 60 %		0.6 %	
	> 60 % to 95 %		0.8 %	
Air temperature	5 °C to 70 °C	LCPN-HR-201, Rev. C:2017 Humidity generator	0.3 K	Comparison with temperature sensor of humidity generator or dew point meter
	10 °C to 70 °C	LCPN-HR-101, Rev. C:2017 Climate cabinet	0.5 K	Comparison with relative humidity and air temperature sensors

Abbreviations used:

DKD-R	Calibration Guide of Deutscher Kalibrierdienst (DKD), published by the Physikalisch-Technische Bundesanstalt (PTB)
EURAMET	European Association of National Metrology Institutes
IEC	International Electrotechnical Commission
ISO	International Organization for Standardisation
LCPN-HR	Calibration procedure of Empresa Nacional de Aeronáutica de Chile

[1] Unless otherwise specified, the unit of a variable corresponds to the unit of the measuring range